NOTES.

THE long-promised Government Bill to deal with the subject of the feeble-minded has appeared at last. A Royal Commission, which was appointed in 1904, reported in 1908, but the Government has taken four years before moving in what is admittedly an urgent matter. It would perhaps be ungrateful to inquire whether even this tardy appearance be due in part to the fact that a private Bill on the same subject was brought before the House of Commons on Friday last. The private Bill, which is due to the National Association for the Care of the Feeble-minded and the Eugenics Education Society jointly, gave rise to an interesting discussion, in which an all but general consensus of opinion was manifested in favour of the permanent care and control of those suffering from mental defect and unable to secure adequate protection in their own homes. The private Bill was read a second time without a division, but whether it will be carried further remains to be seen. It is to be hoped that the Government Bill, which is broader in scope, and grants some, though not adequate, financial provision, may be pressed forward in such a way as to make the more limited private Bill unnecessary. Fear of expense would appear to be groundless, for it is certain that each year's delay involves a prospective charge on the community for the support of hereditary defectives born therein far greater than the annual cost of the full scheme of the commissioners. From the wider points of view of the good of the race and the welfare of the existing sufferers the case is overwhelming.

IN a speech at the anniversary dinner of the Royal Geographical Society on Monday, May 20, Lord Curzon of Kedleston, president of the society, referred to the cosmopolitan character of geographical science. It is, he said, the handmaiden of history, the sister science to economics and to politics, and surrounded by the frontiers of geology, zoology, chemistry, physics, astronomy, and other sciences, while the literature of travel is appreciated by all. It will be remembered that Colonel Close, in his address as president of the Geographical Section of the British Association last year, contended that geography, apart from cartography, cannot be considered as a science in itself, but only as a common meeting-place and popularising medium for other sciences. The fact is that geography is a branch of science when it is studied and developed by scientific methods. Lord Curzon has no sympathy with the dull and pedantic school geography of former days, which meant, in the main, lists of the names and populations of great cities, the heights of mountains, the principal capes and promontories, number of square miles in a certain territory, and so on. More scientific methods of teaching geography are now followed, and the subject has justified the higher place it has gained as an educational factor, both in the school and outside. These are not the days to say that every branch of science must have its boundaries clearly defined. Astronomy long ago entered the domains of physics and chemistry, while these two sciences are scarcely distinguishable as separate departments of knowledge. So it is with biology, which becomes a branch of mathematics in biometric studies and of chemistry in other aspects. So long as geography is concerned with the advancement of knowledge of the earth and its relations to the needs of man it may claim to have a field of inquiry in which valuable work can be carried on for education and science.

THE programme for the educational section of the International Congress of Mathematicians at Cambridge (August 22–28) is now arranged. As already announced, the International Commission on Mathematical Teaching will meet at the same time and place, and in addition to the proceedings of the commission there will be further educational papers in the didactic subsection of the congress. At the first general meeting of the congress, Prof. Klein, president of the commission, will give an account of the work of the commission. The question of prolonging the mandate of the commission until the next congress (four years) will be raised. The commission will then hold three meetings in common with the didactic subsection of the congress, namely:—first meeting, presentation of the reports of the national subcommissions; second meeting, intuition and experiment in mathematical teaching at secondary schools; third meeting, mathematics as needed in the teaching of physics. In addition, the following papers will be read before the didactic subsection:—(1) Prof. J. Perry, the teaching of practical mathematics to evening classes; (2) Prof. M. J. M. Hill, the teaching of the theory of proportion; (3) Dr. T. P. Nunn, the proper scope and method of instruction in the calculus in schools; (4) Dr. A. N. Whitehead, the principles of mathematics in relation to elementary teaching (joint meeting of the didactic and philosophical subsections). Membership of the congress is secured by the payment of £1, which entitles the subscriber to attend the congress and to receive a copy of the Proceedings. The treasurer is Sir J. Larmor, F.R.S., St. John's College, Cambridge.

THE new building of the Royal Society of Medicine, in Wimpole Street, was visited by the King and Queen on Tuesday, May 21, and formally opened by his Majesty. In the course of a reply to an address presented by the society, the King said:—"It gives me great pleasure to open the fine building which will henceforth be the home of the society, and which will provide adequately for the increase in your membership and for the extension of your duties since a new and enlarged charter was granted to you by my father, King Edward. The importance of the society's work is now universally appreciated, and it is a matter of satisfaction that the needs of the society have been generously provided for, and that its varied functions can now be carried on unhampered by lack of space. The health and well-being of the community are safeguarded by the energies of the medical profession. We look to you to fight sickness and disease, and we claim from you an untiring vigilance in this contest and unceasing efforts to find, by the investigation of the laws of nature, new means of combating these enemies. Medical science has revealed by experiment and trained observation new securities for life and health during recent years, and none can doubt that the improved public health is mainly due to the discoveries made by the medical profession in this and other countries, to the guidance given by that profession to civil authorities, and to the sanitary precautions against the spread of disease which they have enforced."

SIR DAVID BRUCE, C.B., F.R.S., has been approved by the King for special promotion to the rank of Surgeon-General, in consideration of his eminent services to science by his work on Malta fever, malaria, sleeping sickness, and other diseases.

DR. D. H. SCOTT, F.R.S., president of the Linnean Society, has been elected a foreign member of the Royal Danish Academy of Sciences and Letters (class of sciences), and foreign member of the Royal Society of Sciences, Upsala.

THE Berlin correspondent of *The Times* reports that on May 20 the Reichstag passed the first and second readings of the supplementary estimates for the promotion of aëronautics by means of the financial support of the recently founded "German Experimental Institute for Aëronautics." The estimates provide for a vote of 10,000*l*. as a contribution towards the founding of the institute and a vote of 2500*l*. towards the cost of maintenance for the financial year 1912.

THE President of the Board of Trade has appointed a technical committee to advise him, in the interests of safety of life at sea, with regard to the internal subdivision of vessels of all classes by watertight bulkheads and other means. The committee is constituted as follows:—Dr. Archibald Denny (chairman), Mr. James Bain, Mr. H. R. Champness, M.V.O., Dr. G. B. Hunter, Mr. Summers Hunter, Mr. J. Foster King, Mr. Andrew Laing, Mr. W. J. Luke, Dr. S. J. P. Thearle, and Prof. J. J. Welch. The secretary to the committee is Mr. Walter Carter, of the Board of Trade, 7 Whitehall Gardens, London, S.W., to whom communications relating to the work of the committee should be addressed.

ON Tuesday next, May 28, Prof. W. M. Flinders Petrie will give the first of two lectures at the Royal Institution on "The Formation of the Alphabet"; on Thursday, May 30, Prof. C. G. Barkla will begin a course of two lectures on "X-rays and Matter"; and on Saturday, June 1, Mr. Willis L. Moore, chief of the United States Weather Bureau, will deliver the first of two lectures on "The Development and Utilities of Meteorological Science." The Friday evening discourse on May 31 will be delivered by Prof. Howard T. Barnes on "Icebergs and their Location in Navigation," and on June 7 by Sir William Macowen on "Lord Lister." An extra Friday evening discourse will be given on June 14 by Mr. A. Henry Savage Landor on "Unknown Parts of South America."

WE learn from *The Times* of May 20 that under the will of the late Lord Wandsworth a sum of 10,000*l*. was bequeathed to Sir William Bennett, to be applied by him at his discretion for the promotion of medical research. Sir William Bennett has decided to entrust the administration of the legacy to the London School of Tropical Medicine, under conditions which include the establishment of a research scholarship, tenable for two or three years, and to be given preferably to a British subject. The committee of management of the Seamen's Hospital has been appointed by Sir William Bennett to be the trustee of the fund, and the research scholar will be appointed by that body on the recommendation of the committee of the London School of Tropical Medicine. It is probable that the first Wandsworth scholar will make human blood parasites the first objects of his study, and that he will proceed to the West Coast of Africa for this purpose.

AMONG the many interesting papers to be presented to the eighteenth International Congress of Americanists, which will be held in London next week, the account of the expedition of the Imperial Russian Geographical Society to Kamchatka and the Aleutian Islands, by Dr. Waldemar Jochelson, is specially worthy of note. The expedition, of which Dr. Jochelson was in charge of the ethnological section, was fitted out in 1908 at the expense of a Russian banker, M. F. P. Riobanschinsky. The expedition excavated thirteen ancient village sites and three burial caves, and explored shell-heaps and other kitchen-midden deposits of the Aleutian Islands. The collections brought back by the expedition included skeletons and skulls, and many prehistoric objects of stone and bone. In addition, much information as to the Aleutian language, folklore, and religion was secured. In 1910 the party crossed to Kamchatka, where old underground dwellings and fortifications were explored, and ancient pottery, the existence of which has been denied by former travellers, was found. The discoveries throw much light on the early relations of Kamchatka and Japan. Dr. Jochelson will also discuss the morphological relations of the language of Kamchatka and of the American Indians, and the identities which he has discovered in their mythology and that of the Indians of the north-west. The paper will be illustrated by a number of lantern-slides and kinematograph films.

WE regret to see the announcement of the death, on Tuesday, May 21, at sixty-two years of age, of Sir Julius Wernher, Bart., whose benefactions to education and science are gratefully remembered. He was greatly interested in education, and in many ways promoted the extension of knowledge, as will be seen in the following extract from an obituary notice in *The Times*:—He was a member of Lord Haldane's Committee on the Royal College of Science and Royal School of Mines, which reported in 1905, and the report of which led to the establishment by Royal Charter of the Imperial College of Science and Technology. In February of last year he was awarded the gold medal of the Institution of Mining and Metallurgy in recognition of his "great personal services to the advancement of technological education." A short time before he had given 10,000*l*. to the National Physical Laboratory for the extension of its metallurgical department. But the greatest monument of his munificence will be the new South African University, if its benefactors' wishes are realised. Inspired by Rhodes's example, Beit had bequeathed property which has realised nearly a quarter of a million for the foundation of a university in the Transvaal; and when after the establishment of the South African Union it was decided to divert this money to the creation of a new teaching university for the whole of South Africa on the Groote Schuur estate at Cape Town, Wernher added a sum to his partner's bequest sufficient to bring up the endowment to 500,000*l.*

A PROVINCIAL meeting of the Royal Meteorological Society was held, on the invitation of the Mayor and Corporation, at Southport on Monday, May 13. After assembling at the Town Hall in the morning, the Fellows were driven to the anemograph station at Marshside, where they saw the pressure-tube anemometers and the anemoscope at work. After luncheon a visit was paid to the Fernley Observatory in Hesketh Park to see the large collection of self-recording and other instruments which are in use at this unique observatory. At the same time a demonstration was given of the method of filling and sending up a *ballon-sonde* with meteorograph attached for ascertaining the temperature in the upper atmosphere. Observations of the track of the balloon were made by means of a theodolite. Later, a meeting of the society was held in the Science and Art School, Dr. H. N. Dickson, president, in the chair. Mr. W. Marriott read a paper on the results of hourly wind and rainfall records at Southport, 1902–11, based upon data supplied by Mr. J. Baxendell, the borough meteorologist. When the hourly results are grouped according to summer and winter seasons, a great contrast in the figures is at once apparent. A most marked diurnal variation in the direction of the wind is shown in the summer, which is due to an extreme local development of land and sea breezes. Mr. J. S. Dines also read a paper on the south-east trade wind at St. Helena, in which he showed that observations tend to confirm the hypothesis of a long-period oscillation in the wind direction at St. Helena.

As it covers two years (1910, 1911), the recently issued report of the Felsted School Scientific Society is more bulky than usual; it is, at the same time, rendered much more attractive by containing reproductions of some of the prize competition photographs taken by members of the society last year. These represent ornithological subjects, including sedge-warblers' nests with eggs of cuckoos. Attention is directed to the interest attaching to a brickfield in the neighbourhood of the school, the clay of which is a plateau deposit containing Palæolithic implements.

THE *Aarsberetning* of the Bergen Museum for 1911 opens with a portrait and memoir of the late Prof. G. H. A. Hansen. Extensive additions are in progress or contemplation to the buildings, among which an illustration is given of one connected with the laboratory. Among the additions to the zoological department special interest attaches to a model of a cave with three newly born bears, of which an illustration is given in the report. Bear cubs, it may be mentioned, are remarkable for their extraordinarily small size at the time of birth.

IN its report for the past year the council of the Royal Zoological Society of Ireland announces the gift of 500*l.* by Lord Iveagh and the receipt of a legacy of 100*l.* from the late Mr. L. O. Hutton. The former sum has been devoted to building a hospital for the animals. Mr. Hutton's legacy, on the other hand, is allocated to the construction of a breeding establishment for salmon and trout, towards the cost of which contributions have also been promised from the Irish Fisheries Office and other bodies interested in the subjects. Experiments have been made in keeping apes and monkeys in the open air with satisfactory results. The collection of lions included twenty-two animals at the close of the year, two of these being presented by H.M. the King. One litter of five lion cubs was produced in the gardens during the year. By the courtesy of the society we are able to give an illustration of this litter from the report.

Photo.] [*J. A. Scott.*

Lion cubs four days old at the Dublin gardens.

SIR ARCHIBALD GEIKIE has sent to *The Times* a letter just received by him from Dr. E. A. Wilson, the chief of the scientific staff of the British Antarctic Expedition. The letter is dated October 31, 1911, at McMurdo Sound, and we extract a few points of interest from it :—The self-registering meteorological instruments have given a continuous record of pressure, temperature, wind velocity, and direction, and these records have been checked every four hours by eye observations. A pressure-tube anemometer has given interesting records which will throw light on the character of Antarctic winds. The upper atmosphere has been investigated by means of small balloons, which have shown the direction of upper currents to a height of 6 miles and the temperature up to 1¾ miles. An almost unbroken record of the magnetic elements has been obtained, and absolute magnetic observations have been made every week. All through the winter the aurora was observed every hour, but very few brilliant displays occurred. Atmospheric electricity has also been studied. Ice work and physiography have afforded much field work. Land forms now appearing in fresh state with receding glaciation are being studied in relation to similar time- and weather-worn structures of other parts of the world. The discovery of evidences of interglacial period of vulcanicity gives additional interest to the study of this volcanic region. Pendulum observations for value of gravity have been carried out. A tide gauge has given a continuous record. Marine biological work has been carried on throughout the winter at a hole kept open in the sea ice for nets, water samples, and sea temperatures. Quantitative and qualitative observations of minute organisms at various seasons give interesting results. The parasitology of all the seals, penguins, other birds, and fish available has already given good results, and some new protozoa have been found.

THE period of Etnean activity which culminated in the eruption of last September began with the opening on May 27, 1911, of a new vent to the north-east of the central crater. This vent is at a height of 3160 metres, or about 80 metres below the north-east rim of the central crater. As seen on June 9 by Prof. A. Riccò, it is triangular in form, the sides being from 80 to 100 metres in length, and though the floor was obscured, its depth was evidently great. That it communicates in some way with the central crater is clear from its position and from the correspondence in the periods of their eruptive action.

WE have received from the Cardiff Naturalists' Society a report of the meteorological observations made in that district for 1911, prepared by Dr. E. Walford. The society is doing very useful work in collecting and discussing the rainfall at forty-seven stations, at heights above sea-level varying from 20 ft. at Barry to 2350 ft. at the summit of Tyle Brith (Brecon). The base of the coast-line extends from Neath to Chepstow. The mean annual rainfall for the whole district was 50·95 in.; July, 0·39 in.; December, 12·35 in. The greatest mean during the last ten years was 67·9 in. in 1903, and the least 39·98 in. in 1905. A complete meteorological station is established at Penylan, Cardiff. The rainfall for 1911, 37·63 in., was 1·38 in. below the average; the mean temperature, 50·5°, was 1·5° above the average. Readings above 80° were recorded on seventeen days, and above 90° on two days. At another station actually in Cardiff, Dr. Vachell recorded shade temperatures above 80° on thirty-eight days, and on three days above 90°; 1911 will be remembered as a record year in this respect.

IN December, 1910, we directed our readers' attention to the preliminary results obtained by Miss Jacob, of the University of Königsberg, in a research on the friction of solids on each other. The work is now completed, and the results are to be found in the May number of the *Annalen der Physik*. At ordinary temperatures perfectly clean, well-polished solids without lubrication will move over each other on the application of forces far below those generally regarded as the least necessary to start the motion. For these small forces the motion generated is uniform, but for larger forces it becomes an accelerated motion. This means that the friction of clean solids on each other is dependent on the velocity. It is independent of the area of contact and of the force pressing the surfaces together, but varies with the temperature. From ordinary temperatures up to 180° C. it decreases to about one-third its initial value, but resumes that value when the bodies are cooled. If they are heated above 180° C. the friction rises rapidly, and retains an abnormally high value after cooling.

IN the *Comptes rendus* for May 6 M. G. Darzens describes the preparation of a new compound of carbon and nitrogen. He names it carbon pernitride, and prepares it by the interaction of cyanogen bromide and sodium hydrazoate, NaN_3. The nitride, N_3—CN, can be separated from the aqueous solution in which it is prepared by ether, and forms colourless needles without smell melting at about 36° C. At a few degrees above its melting point the compound can be sublimed in a high vacuum, but it commences to decompose at 70° C., and detonates with extreme violence at 180° C. It is also very sensitive to shock, and, like all substances containing the N_3 group, must be handled in small quantities only and with suitable precautions against the results of explosion. In aqueous solution the nitride undergoes hydrolysis, giving azocarbonic acid, and ultimately hydrazoic acid and carbon dioxide. Measurements of its heat of decomposition were carried out in a calorimetric bomb; its heat of formation was found to be $-92{\cdot}6$ calories. From these experiments, which were carried out with some difficulty on account of the destructive effect of each combustion on the calorimeter fittings, the author concludes that this pernitride of carbon is the most endothermic substance known.

IN spite of their commercial importance and their wide distribution in plants, the chemical structure of the tannins has so far eluded research. Since the discovery by Strecker, in 1852, that they contained glucose in their molecule, they have been frequently regarded as glucosides of gallic acid. Others, however, have disputed the presence of glucose in the molecule, and tannin is frequently described as digallic acid, a view which is not in agreement with the optical activity. Nierenstein has supposed tannin to be a mixture of digallic acid and optically active leucotannin; this does not agree with the slight acidity of tannin. The recently published researches of Emil Fischer in conjunction with Freudenberg throw a new light on the question. The authors show that carefully purified tannin contains about 8 per cent. of glucose in its molecule. They do not regard tannin as a glucoside of gallic acid, but consider that it is an acyl compound of glucose analogous to the penta-acetyl and penta-benzoyl derivatives of this sugar, in which the alcohol groups form esters with the acid. This novel conception of tannin as a penta-digalloyl glucose is in agreement with its chemical behaviour, but, as is his custom, Fischer has had recourse to synthesis to confirm his views. Digallic acid was not available, but a synthetic penta-galloyl glucose could be obtained without great difficulty, it sufficing to combine glucose with tricarbomethoxygalloyl chloride in presence of quinoline and remove the tricarbomethoxy-groups by cautious hydrolysis with alkali. The new compound has all the properties of the tannins, and there can be little doubt that the new conception is the correct one, and that synthetic tannin will shortly be added to the achievements of the organic chemist.

Successful trials have just been concluded of the first Clyde-built motor ship, *Jutlandia*. An illustrated article in *The Engineer* for May 17 gives some particulars of this ship, which is a sister ship to the *Selandia*. The builders, Messrs. Barclay, Curle and Co., Ltd., Whiteinch, have fitted Diesel engines of the four-cycle type. On the measured mile at Skelmorlie the vessel attained a mean speed of 12 knots, the engines developing 2700 indicated horse-power at 135 revolutions per minute. The fuel used on the trials was oil of specific gravity 0·855, but the engines are capable of using heavier oil, such as is obtainable from the Roumanian or American oil fields. The builders estimate that in regular service the quantity of fuel necessary will be about 10 tons per day of twenty-four hours' continuous running.

Engineering for May 17 gives an account of the system of ozone production and distributing plant installed for air purification and ventilation on the Central London Railway by the firm of Ozonair, Ltd. The system is a plenum one, and consists of Sirocco fans placed at each of the underground stations, excepting that at Shepherd's Bush. The total air supplied to the tubes is about 80,000,000 cubic feet per day. Each fan draws its air through a filter screen, and works in conjunction with an ozone-generating plant. The latter consists of mica sheets with metallic gauze on each side, stacked side by side, and energised by alternating current at about 5000 volts, in such connection that a silent discharge passes between the various plates, so that air flowing between them is ozonised. The ozone generator is supplied from a small transformer, which in turn is supplied with 380 volts alternating current from a small rotary converter. The converter is connected on its direct-current side to the 550-volt lighting circuit of the railway.

OUR ASTRONOMICAL COLUMN.

The Recent Solar Eclipse.—Many preliminary accounts of the solar eclipse of April 17 are given in the May number of *L'Astronomie*; the June number is to be devoted to a fuller discussion.

M. Flammarion—who is to receive the Cross of the Legion of Honour—gives, *inter alia*, a map on which he has drawn the central line derived from numerous observations. Going from south-west to north-east, it passes very slightly to the north of St. Nom-la-Breteche, rather further north of St. Germain-en-Laye, south of Maisons-Laffite, north of Sartrouville, over Franconville and Moisselles, north of Villiers-la-Sec and south of Luzarches.

Analysing the observations made from a dirigible near the last-named place, Comte de la Baume Pluvinel finds that the line is 1·8 km. north of that given by the *Connaissance des Temps*, and that the central phase occurred at the time given by the "American Ephemeris"; this was from fifteen to twenty-five seconds earlier than the times given by other ephemerides. The shadow of the moon, as seen from the dirigible, appeared as a greyish circle 3·5 km. in diameter travelling over the ground at about 800 metres per second. This shadow passed over the villages Belloy and Villiers-la-Sec at the same moment, the former lying near its northern limit.

At Sartrouville, M. Tramblay determined the interval between the appearance and disappearance of the cusps as four seconds. M. G. Renaudot, at Paris, made some very definite and interesting observations of the effects on birds and certain plants, which in every case behaved as they usually do at nightfall. As the eclipse was neither total nor annular, M. Flammarion suggests the designation *d'éclipse perlée*, which would describe the appearance of a collar of irregular pearls seen at maximum phase.

M. Simonin asks that observers will forward to him, at the Paris Observatory, the results of their observations of this eclipse.

Solar Prominences in 1910.—We have received amended tables of Prof. Riccò's summary of the prominences observed during 1910 at Catania, in which some of the values are essentially different from those previously given, which we briefly noted in these columns on May 9. The mean frequencies for the four trimestres should read:—N. hemisphere, 1·9, 1·5, 1·1, and 0·3; S. hemisphere, 1·7, 1·3, 1·2, and 1·4, the mean frequencies for the year being N. 1·2 and S. 1·4. Compared with 1909, the year showed a decrease in the frequency and the size of the prominences. Considering their distribution, there were two principal maxima at 25°–29° and 55°–59°, respectively, in the northern, and two at 15°–19° and 50°–54°, respectively, in the southern, hemisphere.

The United States Naval Observatory.—The superintendent's report of the work performed at the U.S. Naval Observatory for the year ending June 30, 1911, contains, among many other items, several interesting results of investigations of instrumental errors. A wide difference of opinion among the staff concerning the performance of the 6-in. transit circle has been settled, as the result of an investigation lasting over three years, by a declaration that the instrument is fit for the fundamental observations for which it is now to be employed. Another investigation was carried out to determine the cause of a periodic error of exactly four minutes, having a range of more than 5 seconds of arc, in the driving-clock of the 26-in. equatorial. No single cause could be found, so it was decided to correct the error by introducing one of opposite sign and having the same amplitude. This was done by scraping the driving